TITLE 22. SOCIAL SECURITY
DIVISION 4. ENVIRONMENTAL HEALTH
CHAPTER 17. SURFACE WATER TREATMENT

ARTICLE 1. GENERAL REQUIREMENTS AND DEFINITIONS

Section 64650. General Requirements.

(a) For a supplier using an approved surface water, as defined in section 64651.10, this chapter establishes treatment techniques in lieu of maximum contaminant levels for turbidity and the following microbial contaminants: *Giardia* lamblia (cysts), viruses, heterotrophic plate count bacteria, and Legionella. In addition, for suppliers using an approved surface water and serving 10,000 people or more, article 3.5 establishes treatment techniques in lieu of maximum contaminant limits for *Cryptosporidium*.

(b) Each supplier using an approved surface water shall provide multibarrier treatment necessary to reliably protect users from the adverse health effects of microbiological contaminants and to comply with the requirements and performance standards prescribed in this chapter. A supplier that meets the requirements of section 64652.5 and wishes to not be required to provide multibarrier treatment shall submit an application to the Department. That application shall consist of comprehensive documentation that either demonstrates current compliance with the requirements in section 64652.5 or demonstrates that the water system will be in compliance within fifteen months from application submittal. Within 30 days, the Department will review the application and inform the applicant in writing that the application is complete and accepted for filing, or that the application is deficient and what specific information is required. Within 90 days from the date the application is accepted for filing, the Department will complete its review of the documentation, determine whether to approve the application, and notify the water supplier. If at any time the Department determines that a water supplier is not in compliance with the requirements of this chapter, the Department will notify the supplier of that determination within 30 days of its being made.

(c) Except as provided for existing treatment plants in section 64652(c), within 90 days from the date of notification by the Department pursuant to subsection (b), the supplier shall submit for Department approval a plan and schedule to modify its system to meet the requirements of this chapter.

(d) If the supplier disagrees with the Department's notification specified in subsection (b), then the supplier shall submit reasons for its disagreement within 30 days from the receipt of the notification. The Department shall notify the supplier of its final determination in writing within 30 days of receipt of the supplier's reasons for disagreement. If the Department's final determination is that the supplier does not meet the requirements of this chapter, then the supplier shall comply with provisions of subsection (c) within 90 days of receipt of the Department's final determination.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code. Reference: Sections 116270, 116275, 116350, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550 and 116625, Health and Safety Code.

Section 64651.10. Approved surface water

"Approved surface water" means a surface water or groundwater under the direct influence of surface water that has received permit approval from the Department in accordance with sections ~~4011~~ 116525 through ~~4016~~ 116550 of the Health and Safety Code.

NOTE
Authority Cited: Sections ~~208~~100275 and ~~4023.3~~116375, Health and Safety Code. Reference: Sections ~~4010~~116300, ~~4010.1~~116275, ~~4011~~116525, ~~4012~~116530, ~~4013~~116535, ~~4014~~116540, ~~4016~~116550, ~~4023.1~~116365, ~~4023.3~~116375, ~~4024~~116385, ~~4025~~116390, ~~4026.4~~116400, and ~~4031~~116625, Health and Safety Code.

Section 64651.21. Comprehensive performance evaluation (CPE)

"Comprehensive performance evaluation (CPE)" means a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116275, 116300, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, and 116625, Health and Safety Code.

Section 64651.34. Disinfection profile

"Disinfection profile" means a summary of daily *Giardia lamblia* inactivation through the treatment plant, developed pursuant to section 64657.20

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116275, 116300, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, and 116625, Health and Safety Code.

Section 64651.38. Filter profile

"Filter profile" means a graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run, from startup to backwash inclusively, that includes data collected while another filter is being backwashed.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116275, 116300, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, and 116625, Health and Safety Code.

Section 64651.50. Groundwater under the direct influence of surface water

"Groundwater under the direct influence of surface water" means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae or large diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions.

NOTE
Authority cited: Sections ~~208~~100275 and ~~4023.3~~116375, Health and Safety Code.
Reference: Sections ~~4010~~116300, ~~4010.1~~116275, ~~4011~~116525, ~~4012~~116530, ~~4013~~116535, ~~4014~~116540, ~~4016~~116550, ~~4023.1~~116365 ~~4023.3~~116375, ~~4024~~116385, ~~4025~~116390, ~~4026.4~~116400 and ~~4031~~116625, Health and Safety Code.

Section 64651.53. Legionella

"Legionella" means a genus of bacteria, some species of which have caused a type ~~of~~ of pneumonia called Legionnaires disease.

NOTE
Authority cited: Sections ~~208~~100275 and ~~4023.3~~116375, Health and Safety Code.
Reference: Sections ~~4010~~116300, ~~4010.1~~116275, ~~4011~~116525, ~~4012~~116530, ~~4013~~116535, ~~4014~~116540, ~~4016~~116550, ~~4023.1~~116365, ~~4023.3~~116375, ~~4024~~116385, ~~4025~~116390, ~~4026.4~~116400 and ~~4031~~116625, Health and Safety Code.

Section 64651.60. NTU (Nephelometric Turbidity Unit)

"Nephelometric Turbidity Unit (NTU)" means a measurement of the turbidity of water as determined by the ~~ratio of the intensity of~~ light scattered by the sample ~~to the intensity of~~at an angle of 90° from the incident light beam, using instrumentation and methods as set forth in "Standard Methods for the Examination of Water and Wastewater," ~~1985~~1995, American Public Health Association, et al., ~~16th~~ 19th edition, pages ~~134-136~~ 2-9 through 2-11.

NOTE
Authority cited: Sections ~~208~~100275 and ~~4023.3~~116375, Health and Safety Code. Reference: Sections ~~4010~~116300, ~~4010.1~~116275, ~~4011~~116525, ~~4012~~116530, ~~4013~~116535, ~~4014~~116540, ~~4016~~116550, ~~4023.1~~116365, ~~4023.3~~116375, ~~4024~~116385, ~~4025~~116390, ~~4026.4~~116400, and ~~4031~~116625, Health and Safety Code.

Section 64651.88. Uncovered finished water storage facility

"Uncovered finished water storage facility" means a tank, reservoir, or other facility that is open to the atmosphere with no cover or other facilities to prevent access by waterfowl, rodents, or other pests and is used to store water that will undergo no further treatment except residual disinfection.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116275, 116300, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, and 116625, Health and Safety Code.

ARTICLE 2. TREATMENT REQUIREMENT, WATERSHED PROTECTION REQUIREMENTS, AND PERFORMANCE STANDARDS

Section 64652. Treatment requirements and compliance options

(a) Each supplier using an approved surface water shall provide multibarrier treatment that meets the requirements of this chapter and reliably ensures at least:

(1) A total of 99.9 percent reduction of ~~*Giardia*~~*Giardia lamblia* cysts through filtration and disinfection; and

(2) A total of 99.99 percent reduction of viruses through filtration and disinfection.

(b) Suppliers meeting the requirements of section 64654 in combination with either section 64652.5 or 64653 shall be deemed to be in compliance with the minimum reduction requirements specified in section 64652(a).

(c) For treatment plants existing as of June 13, 1990, which do not consist of the approved technologies specified in section 64653(a), or are not in compliance with the design criteria specified in section 64658, the supplier shall submit a report demonstrating that the plant can be operated to reliably produce water meeting the performance requirements of sections 64653 and 64654. This demonstration shall be a presentation and analysis of the latest 12 months of operating data, and special studies conducted to test the performance of the plant under adverse water quality conditions or other means. The supplier shall submit the required report within 15 months of being notified by the Department pursuant to section 64650(b) that their plant does not consist of the approved technologies.

(d) In addition to complying with subsections (a) through (c), suppliers using an approved surface water and serving at least 10,000 people shall also comply with the requirements of article 3.5.

(~~d~~e) No variances from the requirements in this section are permitted.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

Section 64652.5. Criteria for avoiding filtration

(a) A public water system that uses an approved surface water shall meet all of the requirements of this section to avoid the necessity of providing filtration. Within 18 months of the failure of a system using an approved surface water to meet any one of the requirements of ~~Subsections~~ subsections (b) through (l), the system shall have installed filtration and meet the requirements for filtered systems specified in sections 64653, 64658, 64659, 64660, and 64661.

(b) The approved surface water quality shall be monitored downstream of all surface water and groundwater under the influence of surface water contributions and upstream of the first or only point of disinfectant application, as follows:

(1) For fecal or total coliform density at the following minimum frequency each week:

System size (persons served)	Samples/week
< 500	1
501-3,300	2*
3,301-10,000	3*
10,001-25,000	4*
25,000 >	5*

*Shall be taken on separate days.

(2) For fecal or total coliform density, once every day the turbidity of the source water exceeds 1 NTU unless the Department determines that the system, for logistical reasons outside the system's control, is unable to have the sample analyzed within 30 hours of collection. If collected, these samples count toward the weekly coliform sampling requirement.

(3) For turbidity at a minimum frequency of once every four hours. A supplier may substitute continuous turbidity monitoring for grab sample monitoring if, at regular intervals, it validates the accuracy of the continuous measurement using a protocol approved by the Department.

(c) The approved surface water quality monitored pursuant to ~~Subsection~~ subsection (b) shall meet the following criteria:

(1) The fecal coliform concentration shall be equal to or less than 20/100 ml, or the total coliform concentration shall be equal to or less than 100/100 ml, in representative samples of the approved surface water in at least 90 percent of the measurements made for the six previous months that the system served unfiltered approved surface water to the public on an ongoing basis. If a system measures both fecal and total coliforms, the fecal coliform criterion, not the total coliform criterion, in this paragraph shall be met.

(2) The turbidity level shall not exceed 5 NTU in representative samples of the approved surface water unless:

(A) The Department determines that any such event was caused by circumstances that were unusual and unpredictable; and

(B) As a result of any such event, there have not been more than two events in the past 12 months the system served unfiltered approved surface water to the public, or more than five events in the past 120 months the system served unfiltered approved surface water to the public, in which the turbidity level exceeded 5 NTU. An "event" is one day or a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

(d) Water quality information collected pursuant to subsection(a) shall be reported to the Department in conformance with the requirements of CFR section 141.75(a)(1) (54 Fed. Reg. 27535, June 29, 1989).

(e) The supplier shall maintain a watershed control program which minimizes the potential for contamination by ~~*Giardia*~~*Giardia lamblia* cysts and viruses in the source water. The adequacy of a program to limit potential contamination by ~~*Giardia*~~*Giardia lamblia* cysts and viruses shall be determined by: the comprehensiveness of the watershed review; the effectiveness of the supplier's program to monitor and control detrimental activities occurring in the watershed; and the extent to which the water system has maximized land ownership and/or controlled land use within the watershed. At a minimum, the watershed control program shall:

(1) Characterize the watershed hydrology and land ownership;

(2) Identify watershed characteristics and activities which may have an adverse effect on water quality;

(3) Monitor the occurrence of activities which may have an adverse effect on water quality. The supplier shall demonstrate through ownership and/or written agreements with landowners within the watershed that it can control all human activities which may have an adverse impact on the microbiological quality of the water. The supplier shall submit an annual report to the Department that identifies any special concerns about the watershed and how they are being handled; describes activities in the watershed that affect water quality; and projects what adverse activities are expected to occur in the future and how the public water system expects to address them; and

(4) Monitor the presence of ~~*Giardia*~~*Giardia lamblia* cysts in the approved surface water whenever agricultural grazing, water oriented recreation, or point source domestic wastewater discharges occur on the watershed. At a minimum the monitoring shall measure the ~~*Giardia*~~*Giardia lamblia* cyst concentration monthly at a point immediately prior to the first or only point of disinfectant application. The monitoring results shall be included in an annual report to the Department. This

monitoring requirement may be waived after one year for suppliers serving fewer than 500 persons when the monitoring results indicate a mean ~~*Giardia*~~*Giardia lamblia* cyst concentration of 1 cyst per 100 litres or less.

(f) The water system shall be subject to an annual on-site inspection to assess the watershed control program and disinfection treatment process. Either the Department or a party approved by the Department shall conduct the on-site inspection. The inspection shall be conducted by competent individuals who have a sound understanding of public health principles and waterborne diseases, such as sanitary engineers, civil engineers, environmental health specialists, or technicians who have experience and knowledge about the operation and maintenance of a public water system. A report of the on-site inspection summarizing all findings shall be prepared every calendar year and submitted to the Department, if not conducted by the Department, by December 31 of that year. The on-site inspection shall be comprehensive to enable the Department to determine whether the watershed control program and disinfection treatment process are adequately designed and maintained. The on-site inspection shall include:

(1) A review of the effectiveness of the watershed control program;

(2) A review of the physical condition of the source intake and how well it is protected;

(3) A review of the supplier's equipment maintenance program to ensure there is low probability for failure of the disinfection process;

(4) An inspection of the disinfection equipment for physical deterioration;

(5) A review of operating procedures;

(6) A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and

(7) Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.

(g) The water system shall not have been identified as a source of a waterborne microbial disease outbreak, or if it has been so identified, the system shall have been modified sufficiently to prevent another such occurrence, as determined by the Department.

(h) The water system shall comply with the total coliform maximum contaminant level (MCL) specified in 22 CCR section 64426.1 at least 11 of the 12 previous months that the system served water to the public on an ongoing basis, unless the Department determines that failure to meet this requirement was not caused by the unfiltered approved surface water.

(i) Through December 31, 2001 for systems serving 10,000 or more people, or December 31, 2003 for systems serving less than 10,000 people, ~~The~~ the water system shall comply with the requirements for trihalomethanes specified in 22 CCR section 64439 ~~unless the Department determines that failure to meet this requirement was not caused by a deficiency in treatment of the unfiltered approved surface water~~. Beginning January 1, 2002 for systems serving 10,000 or more people, or January 1, 2004 for systems serving less than 10,000 people, the water system shall comply with the requirements for total trihalomethanes, haloacetic acids (five), bromate, chlorite, chlorine, chloramines, and chlorine dioxide specified in 22 CCR chapter 15.5.

(j) The supplier shall provide to the Department an annual report, by December 31st of each year, which summarizes its compliance with all the watershed control program requirements.

(k) The water system shall meet the following special disinfection requirements:

(1) The water system shall not fail to provide disinfection treatment sufficient to ensure at least a 99.9 percent inactivation of ~~*Giardia*~~*Giardia lamblia* cysts and a 99.99 percent inactivation of viruses for more than one day in any month the water system serves unfiltered approved surface water. The means used to demonstrate the required percent inactivation with disinfection shall be as identified in 40 CFR sections 141.72(a)(1), and 141.74(b)(3) and (b)(4). Disinfection information collected pursuant to this subsection shall be reported to the Department in conformance with the requirements of 40 CFR section 141.75(a)(2). The necessity to install filtration as a result of a failure to meet the requirements in subsection (c) will not apply if:

(A) Either the supplier meets the requirements of subsection (c) at least 11 of the 12 previous months that the system served unfiltered approved surface water to the public on an ongoing basis, or

(B) The system fails to meet the requirements of subsection (c) during 2 of the 12 previous months that the system served unfiltered approved surface water to the public, and

(C) The Department determines that failure to meet the requirements in subsection (c) for at least one of these months was caused by circumstances that were unusual and unpredictable.

(2) The disinfection system shall have either:

(A) Redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system; or

(B) Automatic shut-off of delivery of water to the distribution system whenever there is less than 0.2 mg/l of residual disinfectant concentration in the water.

(3) The water system shall meet the requirements of section 64654(b)(1) at all times the system serves unfiltered approved surface water to the public unless the Department determines that any such failure was caused by circumstances that were unusual and unpredictable.

(4) The water system shall meet the requirements of section 64654(b)(2) on an ongoing basis unless the Department determines that failure to meet these requirements was not caused by a deficiency in treatment of the unfiltered approved surface water.

(l) Whenever the monitoring of the quality of the approved surface water indicates the turbidity exceeds 5.0 NTU, or the fecal coliform level exceeds 20/100 mL or the total coliform concentration exceeds 100/100 mL in 10 percent or more of the samples collected in the previous six months during which the system served unfiltered approved surface water to the public on an ongoing basis, the source shall be removed from service. The source may be returned to service when monitoring subsequent to removing the source from service demonstrates that the turbidity is less than or equal to 5.0 NTU and the fecal coliform level is less than or equal to 20/100 mL or the total coliform level is less than or equal to 100/100 mL for two consecutive days, and ~~*Giardia*~~*Giardia lamblia* monitoring results indicate 1 cyst per 100 litres or less. If a system measures both fecal and total coliforms, the fecal coliform criterion, not the total coliform criterion, in this subsection shall be met.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116350, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116625 and 116735, Health and Safety Code.

Section 64653. Filtration

(a) All approved surface water utilized by a supplier shall be treated using one of the following filtration technologies unless an alternative process has been approved by the Department pursuant to subsections (f),(g) and (h):

(1) Conventional filtration treatment

(2) Direct filtration treatment

(3) Diatomaceous earth filtration

(4) Slow sand filtration

(b) Conventional filtration treatment shall be deemed to be capable of achieving at least 99.7 percent removal of ~~*Giardia*~~*Giardia lamblia* cysts and 99 percent removal of viruses when in compliance with operation criteria specified in section 64660 and performance standards specified in subsection(c). Direct filtration treatment, diatomaceous earth filtration and slow sand filtration shall be deemed to be capable of achieving at least a 99 percent removal of ~~*Giardia*~~*Giardia lamblia* cysts and a 90 percent removal of viruses when in compliance with operation criteria specified in section 64660 and performance standards specified in subsections (c) and (d).

(c) Conventional filtration, direct filtration, or diatomaceous earth filtration shall comply with the following performance standards for each treatment plant:

(1) The turbidity level of the filtered water shall be equal to or less than 0.5 NTU in 95 percent of the measurements taken each month and shall not exceed 5.0 NTU at any time.

(2) For those suppliers using a grab sampling monitoring program the turbidity level of the filtered water shall not exceed 1.0 NTU in more than two samples taken consecutively while the plant is in operation. For those suppliers using a continuous monitoring program the turbidity level of the filtered water shall not exceed 1.0 NTU for more than eight consecutive hours while the plant is in operation.

(3) Beginning January 1, 2002, systems serving at least 10,000 people and using either conventional filtration or direct filtration shall meet the turbidity requirements specified in subsection 64657.30(c).

(d) Slow sand filtration shall comply with the following performance standards for each treatment plant:

(1) The turbidity level of the filtered water shall be less than or equal to 1.0 NTU in 95 percent of the measurements taken each month. However, filtered water from the treatment plant may exceed 1.0 NTU, provided the filter effluent prior to disinfection meets the maximum contaminant level for total coliforms as specified in 22 CCR section 64426.1.

(2) The turbidity level of the filtered water shall not exceed 5.0 NTU at any time.

(e) In order to obtain approval for a higher removal efficiency than that specified in subsection (b), a water supplier shall demonstrate to the Department that the higher removal efficiency can be reliably obtained.

(f) An alternative to the filtration technologies specified in subsection (a) may be used provided that the supplier demonstrates to the Department that the alternative technology provides a minimum of 99 percent *Giardia lamblia* cyst removal and 90

percent virus removal for suppliers serving more than 500 persons, or 90 percent *lamblia* cyst removal for suppliers serving 500 or fewer persons and meets the turbidity performance standards established in subsection (d). January 1, 2002, systems shall also provide a minimum of 99 percent oocyst and meet the turbidity performance standards established in section 64657.30(c) The demonstration shall be based on the results from a prior equivalency demonstration or a testing of a full scale installation that is treating a

for treatment. A pilot plant test of the water to be treated may also be used for this demonstration if conducted with the approval of the Department. The demonstration

(g) Suppliers proposing to use an alternative filtration technolog
the Department a waiver to comply with the requirements of subsection (f) to demonstrate 90 percent virus removal. The request shall be based on a watershed

date of the request, that demonstrates a lack of virus hazard in the watershed.

(h)
establishment of performance standards and monitoring requirements, shall be done in accordance with the permit process specified in sections 116525 through 116550 of the

(i)
filtration treatment process approved by the Department, the supplier shall submit an engineering report prepared by a qualified engineer describing the effectiveness of the

shall evaluate compliance with established performance standards under actual operating conditions. It shall also include an assessment of problems experienced, corrective

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.

116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

Section 64654. Disinfection

All approved surface water utilized by a supplier shall be provided with

provides inactivation of ~~*Giardia*~~ *lamblia* cysts and viruses, in conjunction with

section 64652(a).

(b)

(1) Water delivered to the distribution system shall contain a disinfectant residual of not less than 0.2 mg/l for more than four hours in any 24 hour period.

(2) The residual disinfectant concentrations of samples collected from the distribution system shall be detectable in at least 95 percent of the samples taken each month~~, during each and every two consecutive months~~ that the system serves water to the public, except as provided in subsection (c). At any sample point in the distribution system, the presence of heterotrophic plate count (HPC) at concentrations less than or equal to 500 colony forming units per milliliter shall be considered equivalent to a detectable disinfectant residual.

(c) Paragraph (b)(2) shall not apply to suppliers serving fewer than 500 persons provided:

(1) The system is in compliance with 17 CCR sections 7583 through 7605, and with 22 CCR sections 64566 and 64630; and

(2) The supplier has no means for having a sample transported and analyzed for HPC by a certified laboratory under the appropriate time and temperature conditions; and

(3) ~~the~~ The supplier is providing adequate disinfection in the distribution system.

(d) No exemptions from the requirement in paragraph (b)(1) are permitted.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116555, 116625, 116735 and 116750, Health and Safety Code.

ARTICLE 3. MONITORING REQUIREMENTS

Section 64655. ~~Filtration~~Treatment Plant Process Monitoring

(a) Each supplier using an approved surface water source shall monitor the turbidity level of each raw water supply by the taking and analyzing of daily grab samples.

(b) Each supplier using an approved surface water source shall monitor the raw water supply for total coliform and either fecal coliform or E.coli bacteria using density analysis no less than once each month. Monitoring shall be conducted in accord with the operation plan required by section 64661.

(c) Each supplier using conventional filtration shall monitor the turbidity of the settled water at least once each day in accord with the operation plan required by section 64661.

(d) Each supplier recycling filter backwash water shall monitor the turbidity and determine the flow of the recycled water at least once each day or once during each recycle event, whichever is less. Monitoring shall be conducted in accord with the operation plan required by section 64661.

~~(b)~~(e) To determine compliance with the performance standards specified in section 64653, each supplier shall determine the turbidity level of representative samples of the combined filter effluent, prior to clearwell storage, at least once every four hours that the system is in operation, except as provided in subsections (~~d~~g) and (h). Monitoring shall be conducted in accord with the operation plan required by section 64661.

~~(c)~~(f) Continuous turbidity measurements may be substituted for grab sample monitoring provided the supplier validates the accuracy of the measurements on a weekly basis.

~~(d)~~(g) Suppliers using slow sand filtration or serving 500 or fewer persons which are in compliance with performance standards specified in section 64653, may reduce turbidity monitoring to one grab sample per day.

(h) Beginning January 1, 2002, suppliers using conventional filtration or direct filtration, and serving at least 10,000 people shall conduct turbidity monitoring pursuant to section 64657.40.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

ARTICLE 3.5.ENHANCED FILTRATION AND DISINFECTION

Section 64657. General Requirements

(a) Except as specified in subsection (c), beginning January 1, 2002 suppliers using an approved surface water and serving at least 10,000 people shall comply with the requirements in this article.

(1) Water suppliers shall install and properly operate water treatment processes that reliably achieve at least 99 percent (2-log) removal of *Cryptosporidium* between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered water systems, or achieve *Cryptosporidium* control under the watershed control plan for unfiltered systems.

(2) Water suppliers shall comply with the profiling and benchmarking requirements in section 64657.20.

(b) A water supplier is considered to be in compliance with the requirements of subsection (a) if:

(1) It meets the requirements for avoiding filtration in section 64652.5 and 64657.10 and the requirements in section 64654 and 64657.20; or

(2) It meets the applicable filtration requirements in either section 64653 or section 64657.30 and the requirements in section 64654 and 64657.20.

(c) Suppliers shall not begin construction of uncovered finished water storage facilities after January 1, 2002.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

Section 64657.10 Criteria for avoiding filtration

(a) In addition to the requirements specified in section 64652.5, a water system that uses an approved surface water shall meet all of the requirements of this section to avoid the necessity of providing filtration. Within 18 months of the failure of a system using an approved surface water to meet any one of the requirements of subsections (b) and (c), the system shall have installed filtration and meet the requirements for filtered systems specified in sections 64653, 64658, 64659, 64660, and 64661.

(b) To minimize the potential for contamination by *Cryptosporidium* oocysts in the source water, the watershed control program required in subsection 64652.5(e) shall also include the following:

(1) Identify watershed characteristics and activities that may have an adverse effect on source water quality; and

(2) Monitor the occurrence of activities that may have an adverse effect on source water quality.

(c) The onsite inspection conducted pursuant to subsection 64652.5(f) shall also determine if the program will minimize the potential for contamination by *Cryptosporidium* based on an evaluation of the following:

(1) The comprehensiveness of the watershed review;

(2) The effectiveness of the supplier's program to monitor and control detrimental activities occurring in the watershed; and

(3) The extent to which the water system has maximized land ownership and/or controlled land use within the watershed.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116350, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116625 and 116735, Health and Safety Code.

Section 64657.20 Disinfection Profiling and Benchmarking

(a) By January 1, 2002, each system shall have completed TTHM and HAA5 monitoring and reporting as prescribed in Section 141.172(a) of Title 40, Code of Federal Regulations, as published in the December 16, 1998, Federal Register (Vol. 63, No. 241), and revised in the January 16, 2001 Federal Register (Vol. 66, No. 10), and any system that had either a TTHM annual average ≥0.064 mg/L or an HAA5 annual average ≥0.048 mg/L, as determined by section 141.172(a), shall have developed a disinfection profile over a period of 12 to 36 months pursuant to the following:

(1) Each system shall monitor daily to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 64657.20-A through H, depending on disinfectant used and temperature, through the entire treatment plant. As a minimum, a system with a single point of disinfectant application prior to entrance to the distribution system shall conduct the monitoring in subparagraphs (A) through (D) for each disinfection segment. Each day during peak hourly flow a system shall determine the following:

(A) The temperature of the disinfected water, measured once at each residual disinfectant concentration sampling point.

(B) If the system uses chlorine, the pH of the disinfected water measured once at each chlorine residual disinfectant concentration sampling point.

(C) The disinfectant contact time(s) ("T").

(D) The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection.

(2) The system shall calculate the total inactivation ratio as follows:

(A) If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio for the disinfection segment using one of the following methods:

1. Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.

2. Determine successive $CTcalc/ CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system shall calculate the total inactivation ratio by determining ($CTcalc/ CT_{99.9}$) for each sequence and then adding the ($CTcalc/ CT_{99.9}$) values together to determine ($\sum(CTcalc/ CT_{99.9})$).

(B) If the system uses more than one point of disinfectant application before the first customer, the system shall determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CTcalc/ CT_{99.9}$) value of each segment and ($\sum(CTcalc/ CT_{99.9})$) shall be calculated pursuant to subparagraph (A).

(C) The system shall determine the total logs of inactivation by multiplying the value calculated in subparagraph (A) or (B) by 3.0.

(3) A system that uses either chloramines or ozone for primary disinfection shall also calculate the logs of inactivation for viruses using Table 64657.20-I or 64657.20-J and the procedure outlined in paragraphs (1) and (2).

(4) The system shall retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the Department for review during the sanitary survey.

Table 64657.20-A
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Free Chlorine at 0.5 °C or Lower[1]

Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	137	163	195	237	277	329	390
0.6	141	168	200	239	286	342	407
0.8	145	172	205	246	295	354	422
1.0	148	176	210	253	304	365	437
1.2	152	180	215	259	313	376	451
1.4	155	184	221	266	321	387	464
1.6	157	189	226	273	329	397	477
1.8	162	193	231	279	338	407	489
2.0	165	197	236	286	346	417	500
2.2	169	201	242	297	353	426	511
2.4	172	205	247	298	361	435	522
2.6	175	209	252	304	368	444	533
2.8	178	213	257	310	375	452	543
3.0	181	217	261	316	382	460	552

[1] These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

Table 64657.20-B
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Free Chlorine at 5.0 °C[1]

Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	97	117	139	166	198	236	279
0.6	100	120	143	171	204	244	291
0.8	103	122	146	175	210	252	301
1.0	105	125	149	179	216	260	312
1.2	107	127	152	183	221	267	320
1.4	109	130	155	187	227	274	329
1.6	111	132	158	192	232	281	337
1.8	114	135	162	196	238	287	345
2.0	116	138	165	200	243	294	353
2.2	118	140	169	204	248	300	361
2.4	120	143	172	209	253	306	368
2.6	122	146	175	213	258	312	375
2.8	124	148	178	217	263	318	382
3.0	126	151	182	221	268	324	389

[1] These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

Table 64657.20-C
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Free Chlorine at 10.0 °C[1]

Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	73	88	104	125	149	177	209
0.6	75	90	107	128	153	183	218
0.8	78	92	110	131	158	183	218
1.0	79	94	112	134	162	195	234
1.2	80	95	114	137	166	200	240
1.4	82	98	116	140	170	206	247
1.6	83	99	119	144	174	211	253
1.8	86	101	122	147	179	215	259
2.0	87	104	124	150	182	221	265
2.2	89	105	127	153	186	225	271
2.4	90	107	129	157	190	230	276
2.6	92	110	131	160	194	234	281
2.8	93	111	134	163	197	239	287
3.0	95	113	137	166	201	243	292

[1] These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

Table 64657.20-D
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Free Chlorine at 15.0 °C[1]

Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	49	59	70	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	60	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

[1] These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

Table 64657.20-E
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Free Chlorine at 20 °C[1]

Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	36	44	52	62	74	89	105
0.6	38	45	54	64	77	92	109
0.8	39	46	55	66	79	95	113
1.0	39	47	56	67	81	98	117
1.2	40	48	57	69	83	100	120
1.4	41	49	58	70	85	103	123
1.6	42	50	59	72	87	105	126
1.8	43	51	61	74	89	108	129
2.0	44	52	62	75	91	110	132
2.2	44	53	63	77	93	113	135
2.4	45	54	65	78	95	115	138
2.6	46	55	66	80	97	117	141
2.8	47	56	67	81	99	119	143
3.0	47	57	68	83	101	122	146

[1] These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

Table 64657.20-F
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Free Chlorine at 25 °C[1]

Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	24	29	35	42	50	59	70
0.6	25	30	36	43	51	61	73
0.8	26	31	37	44	53	63	75
1.0	26	31	37	45	54	65	78
1.2	27	32	38	46	55	67	80
1.4	27	33	39	47	57	69	82
1.6	28	33	40	48	58	70	84
1.8	29	34	41	49	60	72	86
2.0	29	35	41	50	61	74	88
2.2	30	35	42	51	62	75	90
2.4	30	36	43	52	63	77	92
2.6	31	37	44	53	65	78	94
2.8	31	37	45	54	66	80	96
3.0	32	38	46	55	67	81	97

[1] These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

Table 64657.20-G
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Chlorine Dioxide and Ozone[1]

	Temperature					
	< 1 °C	5 °C	10 °C	15 °C	20 °C	≥ 25 °C
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.9	1.9	1.4	0.95	0.72	0.48

[1] These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

Table 64657.20-H
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Giardia Lamblia Cysts by Chloramines[1]

Temperature					
< 1 °C	5 °C	10 °C	15 °C	20 °C	25 °C
3,800	2,200	1,850	1,500	1,100	750

[1] These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system must demonstrate, based on on-site studies or other information, as approved by the Department, that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

Table 64657.20-I
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Viruses by Chloramines[(1,2,3)]

Temperature					
< 1 °C	5 °C	10 °C	15 °C	20 °C	25 °C
2,063	1,423	1,067	712	534	356

[1] These values are for pH values of 6.0 to 10.0 at a temperature of 5°C.
[2] CT values shall be adjusted to other temperatures by doubling CT for each 10°C drop in temperature.
[3] These CT values apply only if chlorine is added and mixed in the water prior to the addition of ammonia. CT values between the indicated temperatures shall be determined by linear interpolation.

Table 64657.20-J
CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of Viruses by Ozone[1]

Temperature					
< 1 °C	5 °C	10 °C	15 °C	20 °C	≥ 25 °C
1.4	0.9	0.8	0.5	0.4	0.25

[1] CT values between the indicated temperatures shall be determined by linear interpolation.

(b) Any system required to develop a disinfection profile pursuant to subsection (a) that proposes to change the point of disinfection, disinfectant(s) used in the treatment plant, disinfection process, or any other disinfectant-related process identified by the Department, shall comply with paragraphs (1) through (3).

(1) The system shall develop a disinfection profile over a period of 12 to 36 months pursuant to paragraphs (a)(1)-(4) and calculate its disinfection benchmark as follows:

(A) For each year of profiling data collected and calculated under subsection (a), the system shall determine the lowest average monthly *Giardia lamblia* inactivation. To make this determination, the system shall first determine the average *Giardia lamblia* inactivation for each calendar month of the year by dividing the sum of daily *Giardia lamblia* inactivations by the number of values calculated for that month.

(B) For systems with one year of profiling data, the disinfection benchmark is the lowest monthly average value. For systems with more than one year of profiling data, the disinfection benchmark is the average of the single lowest monthly average values for each year of profiling data.

(2) A system that uses either chloramines or ozone for primary disinfection shall also calculate the disinfection benchmark for viruses using the method outlined in subparagraphs (1)(A) and (B).

(3) The system shall submit the following information to the Department:

(A) A description of the proposed change;

(B) The disinfection profile for *Giardia lamblia* (and, if required pursuant to paragraph (3), viruses) and benchmark; and

(C) An analysis of how the proposed change will affect the current levels of disinfection.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

Section 64657.30 Filtration

(a) By January 1, 2002, a water system that does not meet all of the criteria in sections 64652.5 and 64657.10 for avoiding filtration shall provide treatment consisting of both disinfection, as specified in section 64654, and filtration, as specified in subsection (b), (c), or (d).

(b) Diatomaceous earth and slow sand filtration that meets the performance requirements specified for those technologies in subsections 64653 (c) and (d).

(c) Conventional filtration and direct filtration that meets the following performance standards for each treatment plant:

(1) The turbidity level of the combined filter effluent shall be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month and shall not exceed 1 NTU for more than 1 hour, measured pursuant to section 64657.40;

(2) The turbidity level of the combined filter effluent measured at four-hour intervals shall never exceed 1 NTU; and

(3) The turbidity level of the combined filter effluent shall not exceed 1.0 NTU for more than 8 consecutive hours while the plant is operating.

(d) An alternative to the filtration technologies specified in subsections (b) and (c) may be used provided that the supplier demonstrates to the Department, pursuant to section 64653(f), that the alternative technology provides a minimum of 99 percent *Giardia lamblia* cyst removal, 99 percent *Cryptosporidium* oocyst removal, and 90 percent virus removal, and meets the turbidity performance standards established in subsection (c).

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

Section 64657.40 Filtration sampling

(a) In addition to monitoring required by subsections 64655(a) through (d), and in lieu of the monitoring required by subsection 64655(e), a water system that provides conventional filtration or direct filtration shall conduct continuous turbidity monitoring of each individual filter and the combined filter effluent. Monitoring shall be conducted pursuant to the operation plan required by section 64661 and monitoring of the combined filter effluent shall be conducted prior to clearwell storage.

(b) For the purpose of determining compliance with the performance standards specified in section 64657.30(c) and the operating criteria specified in section 64660(b)(7), the results of the continuous monitoring shall be recorded at least once every 15 minutes that the system is in operation.

(c) The water supplier shall verify the accuracy of turbidimeters used to comply with the requirements of this section on at least a weekly basis for instruments monitoring the combined filter effluent, and at least a monthly basis for instruments monitoring individual filter effluents.

(d) If there is a failure in the continuous turbidity monitoring system, or there are interruptions in continuous monitoring due to system maintenance, the water supplier shall conduct grab sampling every four hours in lieu of continuous monitoring, but continuous monitoring shall be reinitiated within 48 hours of system failure or maintenance interruption for the combined effluent, and within five working days for individual filter effluents.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

Section 64657.50 Supplemental Reporting and Recordkeeping

(a) Beginning January 1, 2002, a water system that provides conventional filtration or direct filtration shall include the following results of monthly turbidity monitoring of the combined filter effluent, in lieu of those specified in section 64664(b):

(1) The total number of combined filter effluent turbidity measurements taken during the month pursuant to section 64657.40.

(2) The turbidity achieved 50, 90, 95, 98, and 99 percent of the time that the plant was producing water.

(3) The date, time, and value of any turbidity measurements taken during the month that exceed 1 NTU.

(4) In lieu of the requirements of paragraphs (2) and (3), the system may report:

(A) the results of turbidity measurements recorded at intervals no greater than every 4 hours, and

(B) all results that exceed 0.3 NTU, recorded at intervals no greater than every 15 minutes, and

(C) the percent of turbidity measurements that are less than or equal to 0.3 NTU, based on all measurements recorded during the month at intervals no greater than every 15 minutes.

(b) Water suppliers shall verify that the data reported according to subsection (a) is accurate and is not compromised by system or instrument maintenance, hardware or software problems, signal transmission problems, or for other technical reasons.

(c) Systems shall report to the Department that they have conducted individual filter turbidity monitoring pursuant to section 64657.40.

(d) The filter number, the turbidity measurements and the date(s) and time(s) of the exceedances, and a filter profile produced within 7 days of the exceedance (if the system is not able to identify and report an obvious reason for the abnormal filter performance) shall be included in the monthly report if either of the following occurs:

(1) An individual filter has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken no more than 15 minutes apart; or

(2) after a backwash or being taken offline for some other reason, an individual filter has a measured turbidity level of greater than 0.3 NTU in two consecutive measurements taken no more than 15 minutes apart after the filter has been in continuous operation for 60 minutes or more.

(e) For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken no more than 15 minutes apart at any time in each of three consecutive months, the system shall conduct a self-assessment of the filter within 14 days of the exceedance and report to the Department that the self-assessment was conducted. The self-assessment shall consist of at least the following components: Assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report to be submitted to the Department within 28 days of the exceedance.

(f) For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken no more than 15 minutes apart at any time in each of two consecutive months, the system shall arrange for the conduct of a comprehensive performance evaluation (CPE) by the Department or a party approved by the Department no later than 30 days following the exceedance and have the evaluation completed and submitted to the Department no later than 90 days following the exceedance. The CPE shall be conducted by competent individuals who have a sound understanding of public health principles and waterborne diseases, such as sanitary engineers, civil engineers, environmental health specialists, or technicians who have experience and knowledge about the operation and maintenance of a public water system. The CPE shall consist of at least the following components: Assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a report.

NOTE
Authority cited: Sections 100275, 116375, and 116450, Health and Safety Code.
Reference: Sections 116300, 116275, 116525, 116530, 116535, 116540, 116550, 116555, 116365, 116375, 116385, 116390, 116400, 116625, and 116735, Health and Safety Code.

ARTICLE 4. DESIGN STANDARDS

Section 64658. New treatment plants

(a) Suppliers which propose to construct new filtration and disinfection treatment facilities or to modify or make additions to existing treatment facilities which require permit approval from the Department pursuant to Health and Safety Code sections ~~4011~~ 116525 through ~~4016~~ 116550 shall submit an engineering report to the Department describing how the proposed new treatment facilities will be designed to comply with the treatment, design, performance and reliability provisions required pursuant to this chapter. Modifications requiring permit approval include those that have a significant effect on plant performance, change the plant design rating or capacity, or change a major treatment process.

(b) All new filtration and disinfection facilities shall be designed and constructed to comply with the following criteria:

(1) Achieve an average daily effluent turbidity goal of 0.2 NTU when using conventional, direct, and diatomaceous earth filtration plants.

(2) Be free of structural and sanitary hazards.

(3) Protect against contamination by backflow.

(4) Meet the capacity and pressure requirements prescribed in 22 CCR sections 64562 and 64566.

(5) Provide flow measuring and recording equipment.

(6) Take into consideration the effects of events such as earthquakes, fires, floods, freezing, and sabotage that are reasonably foreseeable.

(7) Provide reasonable access for inspection, maintenance, and monitoring of all unit processes.

(8) Provide for filter-to-waste for each filter unit or addition of coagulant chemicals to the water used for backwashing.

(9) Provide backwash rates and surface or subsurface wash facilities using air, water or a combination thereof to clean the filter after use to its original condition.

(10) Provide solids removal treatment for filter backwash water if it is recycled into the treatment process. Recycled backwash water shall be returned to the headworks of the treatment plant.

(11) Provide for the future addition of pretreatment facilities in the design of direct filtration, slow sand, or diatomaceous earth filtration plants.

(12) Provide disinfection equipment sized for the full range of flow conditions expected and capable of feeding accurately at all flow rates.

(13) Provide for treatment plant operation without frequent shutdowns and startups or rapid changes in filtration rates.

(c) Whenever a coagulation process is used, the process selection shall be based on pilot plant or laboratory scale (jar test) or equivalent results that demonstrate effectiveness of the coagulant chemicals over the full range of water quality conditions expected.

NOTE
Authority cited: Sections ~~208~~100275 and ~~4023.3~~116375, Health and Safety Code. Reference: Sections ~~4010~~116300, ~~4010.1~~116275, ~~4011~~116525, ~~4012~~116530, ~~4013~~116535, ~~4014~~116540, ~~4016~~116550, ~~4023.1~~116365, ~~4023.3~~116375, ~~4024~~116385, ~~4025~~116390, ~~4026.4~~116400, ~~4031~~116625 and ~~4039~~116735, Health and Safety Code.

ARTICLE 5. OPERATION

Section 64660. Operating criteria

(a) All treatment plants utilizing an approved surface water shall be operated by operators certified by the Department in accordance with Health and Safety Code section 106885.

(b) Filtration facilities shall be operated in accordance with the following requirements:

(1) Conventional and direct filtration plants shall be operated at flow rates not to exceed 3.0 gallons per minute per square foot (gpm/sq. ft.) for single media filters and 6.0 gpm/sq. ft. for deep bed, dual or mixed media filters under gravity flow conditions. For pressure filters, filtration rates shall not exceed 2.0 gpm/sq. ft. for single media filters and 3.0 gpm/sq. ft. for dual, mixed media, or deep bed filters.

(2) Slow sand filters shall be operated at filtration rates not to exceed 0.10 gallon per minute per square foot. The filter bed shall not be dewatered except for cleaning and maintenance purposes.

(3) Diatomaceous earth filters shall be operated at filtration rates not to exceed l.0 gallon per minute per square foot.

(4) In order to obtain approval for filtration rates higher than, but not more than twice, those specified in paragraphs (b)(1), (b)(2), and (b)(3), a water supplier shall demonstrate to the Department that the filters can comply with the performance requirements of section 64653.

(5) In order to obtain approval for filtration rates greater than twice those specified in paragraphs (b)(1), (b)(2), and (b)(3), a water supplier shall demonstrate to the Department that the filters do the following:

(A) Provide a minimum of 99 percent ~~*Giardia*~~*Giardia lamblia* cyst removal and 90 percent virus removal; ~~and~~

(B) Meet the turbidity performance standards established in section 64653(c)~~.~~; and~~.~~

(C) Systems serving at least 10,000 people shall provide a minimum 99 percent *Cryptosporidium* oocyst removal and meet the turbidity performance standards established in section 64657.30.

(6) Filtration rates shall be increased gradually when placing filters back into service following backwashing or any other interruption in the operation of the filter.

(7) When any individual filter in a conventional or direct filtration plant is placed back into service following backwashing or other interruption event, the filtered water turbidity of the effluent from that filter shall not exceed any of the following:

(A) 2.0 NTU at any time during the first four hours of filter operation following all interruption events.

(B) 1.0 NTU at any time during the first four hours of filter operation following at least 90 percent of the interruption events during any consecutive 12 month period.

(C) 0.5 NTU at the time that the filter has been in operation for 4 hours.

(8) Pressure filters shall be physically inspected and evaluated annually for such factors as media condition, mudball formation, and short circuiting. A written record of the inspection shall be maintained at the treatment plant.

(9) Coagulation and flocculation unit processes shall be in use at all times during which conventional and direct filtration treatment plants are in operation. The effectiveness of these processes shall be demonstrated by either at least an 80 percent

reduction through the filters of the monthly average raw water turbidity or jar testing, pilot testing or other means to demonstrate that optimum coagulation is being achieved.

(10) The filtered water turbidity level from each filter unit shall be monitored with a continuous turbidity meter and recorder, or with a grab sampling program designed to identify compliance with the requirements of paragraph (b)(7) and approved by the Department. If this monitoring indicates that any filter unit in a conventional or direct filtration plant is not performing as required in paragraph (b)(7), the filter shall be taken out of service and inspected to determine the cause of its inadequate performance. The filter unit shall not be returned to service until any deficiencies have been corrected and operations tests demonstrate that the filter unit is meeting the requirements of paragraph (b)(7).

(c) Disinfection facilities shall be operated in accordance with the following requirements:

(1) A supply of chemicals necessary to provide continuous operation of disinfection facilities shall be maintained as a reserve or demonstrated to be available.

(2) An emergency plan shall be developed prior to initiating operation of the disinfection facilities. The plan shall be implemented in the event of disinfection failure to prevent delivery to the distribution system of any undisinfected or inadequately disinfected water. The plan shall be posted in the treatment plant or other place readily accessible to the plant operator.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116460, 116525, 116530, 116535, 116540, 116550, 116555, 116625, 116735 and 106885, Health and Safety Code.

Section 64661. Operations plan

(a) All suppliers shall operate each treatment plant under an operations plan that has been approved by the Department. With a permit application for a new treatment plant or modification to an existing treatment plant, suppliers shall submit for Department review and approval an operations plan for each treatment plant that treats an approved surface water. The Department shall review the operations plan to determine if it includes those items required in subsection (b). The operations plan shall be designed to produce the optimal water quality from the treatment process. The supplier shall operate its treatment plant in accordance with the approved plan.

(b) The operations plan shall consist of a description of the utility's treatment plant performance monitoring program, unit process equipment maintenance program, filter media inspection program, operating personnel, including numbers of staff, certification levels and responsibilities; how and when each unit process is operated; laboratory

procedures; procedures used to determine chemical dose rates; records; response to plant and watershed emergencies; and reliability features.

NOTE
Authority cited: Sections 100275 and 116375, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116450, 116460, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.

Section 64662. Records

(a) The supplier shall maintain accurate and complete operation records for each treatment plant that treats an approved surface water. The records shall include but not be limited to the following:

(1) The results of all monitoring conducted in accordance with sections 64655, 64656, 64657.20, 64657.40, 64657.50, and 64660.

(2) Dates on which filter maintenance and inspections were performed and the results of any inspections including pressure filter evaluations required by section 64660(b)(7).

(3) Quantity of water produced, plant flow rates, filtration rates, hours of operation, and backwash rates.

(4) Dates and description of major equipment and process failures and corrective actions taken.

(b) Treatment plant records shall be retained for not less than ~~two~~ three years, except where the Department has determined that longer retention times are necessary to complete legal actions taken under the provisions of Health and Safety Code sections ~~4031~~ 116625 through ~~4038~~116730.

NOTE
Authority cited: Sections ~~208~~100275 and ~~4023.3~~116375, Health and Safety Code.
Reference: Sections ~~4010~~116300, ~~4010.1~~116275, ~~4011~~116525, ~~4012~~116530, ~~4013~~116535, ~~4014~~116540, ~~4016~~116550, ~~4017~~116555, ~~4023.1~~116365, ~~4023.3~~116375, ~~4024~~116385, ~~4025~~116390, ~~4026.4~~116400, ~~4028~~116450, ~~4031~~116625 and ~~4039~~116735, Health and Safety Code.

ARTICLE 6. REPORTING

Section 64663. Department notification

The supplier shall notify the Department as soon as possible, but no later than by the end of the next business day, or within 24 hours, whichever is less, by telephone or other equally rapid means whenever:

(a) The turbidity of the combined filter effluent as monitored pursuant to section 64655 or 64657.40(a) or (d) exceeds 5.0 NTU at any time.

(b) More than two consecutive turbidity samples of the combined filter effluent taken every four hours pursuant to section 64655 exceed l.0 NTU, or samples collected pursuant to section 64657.40(a) or (b) exceed 1 NTU for more than 1 hour, or samples collected pursuant to section 64657.40(a), (b), or (d), exceed 1.0 NTU for 8 or more hours.

(c) There is a failure to maintain a minimum disinfectant residual of 0.2 mg/l in the water being delivered to the distribution system. The supplier shall report whether or not the disinfectant residual was restored to at least 0.2 mg/l within four hours.

(d) An event occurs which may affect the ability of the treatment plant to produce a safe, potable water including but not limited to spills of hazardous materials in the watershed and unit treatment process failures.

(e) The turbidity immediately prior to the first or only point of disinfectant application exceeds 5 NTU for suppliers avoiding filtration.

(f) The supplier discovers the occurrence of an acute infectious illness that may be potentially attributable to the water system.

NOTE
Authority cited: Sections 100275, 116375 and 116450, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116450, 116460, 116525, 116530, 116535, 116540, 116550, 116555, 116625, 116735 and 116750, Health and Safety Code.

Section 64664. Monthly report

(a) Each supplier with an approved surface water treatment facility shall submit a monthly report on the operation of each facility to the Department by the tenth day of the following month. The report shall be signed by the chief water treatment plant operator, plant superintendent or other person directly responsible for the operation of the water treatment plant.

(b) The report shall include the following results of turbidity monitoring of the combined filter effluent:

(1) All turbidity measurements taken during the month to determine compliance with section 64653.

(2) The number and percent of turbidity measurements taken during the month which are less than or equal to the performance standard specified for each filtration technology in section 64653, or as required for an alternative treatment process. The report shall also include the date and value of any turbidity measurements that exceed performance levels specified in section 64653.

(3) The average daily turbidity level.

(4) If the turbidity level of the filter effluent from a slow sand filter is greater than 1.0 NTU in five percent or more of the measurements taken that month, the supplier must also report the dates and results of total coliform sampling of the filter effluent prior to disinfection to demonstrate compliance with section 64653(d)(1).

(c) The report shall include the following disinfection monitoring results taken to comply with section 64654:

(1) The date and duration of each instance when the disinfectant residual in water supplied to the distribution system is less than 0.2 mg/l and when the Department was notified of the occurrence.

(2) The following information on samples taken from the distribution system to comply with section 64654(b)(2):

(A) The number of samples where the disinfectant residual is measured.

(B) The number of samples where only the heterotrophic plate count (HPC) is measured.

(C) The number of measurements with no detectable disinfectant residual and no HPC is measured.

(D) The number of measurements with no detectable disinfectant residual and HPC is greater than 500 colony forming units per milliliter.

(E) The number of measurements where only HPC is measured and is greater than 500 colony forming units per milliliter.

(F) For the current and previous month the supplier serves water to the public, the value of V in the following formula:

$$V = \left[1 - \frac{(C + D + E)}{(A + B)} \right] 100$$

Where V = the percent of distribution system samples with a detectable residual.

A = the value in paragraph (2)(A) of this subsection.

B = the value in paragraph (2)(B) of this subsection.

C = the value in paragraph (2)(C) of this subsection.

D = the value in paragraph (2)(D) of this subsection.

E = the value in paragraph (2)(E) of this subsection.

(3) For each day the lowest measurement of residual disinfectant concentration in mg/l in the water entering the distribution system.

(d) The report shall include the following raw water and process water analytical results:

(1) All raw water turbidity measurements taken during the month pursuant to section 64655(a). If more than one sample is taken each day, the average of all samples taken that day may be reported.

(2) All raw water coliform measurements taken during the month pursuant to section 64655(b).

(3) Daily settled water turbidity for each day of the month, measured pursuant to section 64655(c).

(4) Daily recycled water turbidity for each day of the month that backwash water was recycled back into the treatment process, measured pursuant to section 64655(d).

~~(d)~~(e) The report shall include a written explanation of the cause of any violation of performance standards specified in sections 64653, ~~and~~ 64654, or 64657.30, and operating criteria specified in sections 64660(b)(~~6~~7) and (~~8~~9).

~~(e)~~(f) The report shall include a summary of water quality complaints and reports of gastrointestinal illness received from consumers.

NOTE
Authority cited: Sections ~~208~~100275, ~~4023.3~~116375, and ~~4028~~116450, Health and Safety Code.
Reference: Sections ~~4010~~116300, ~~4010.1~~116275, ~~4011~~116525, ~~4012~~116530, ~~4013~~116535, ~~4014~~116540, ~~4016~~116550, ~~4017~~116555, ~~4023.1~~116365, ~~4023.3~~116375, ~~4024~~116385, ~~4025~~116390, ~~4026.4~~116400, ~~4031~~116625, and ~~4039~~116735, Health and Safety Code.

ARTICLE 8. PUBLIC NOTIFICATION

Section 64666. Consumer notification

(a) For water systems that filter approved surface water, the supplier shall notify persons served by the system whenever there is a failure to comply with any of the treatment requirements specified in sections 64650(c), 64652, 64653, and 64654(a) or performance standards specified in sections 64653(c)(1), (d), (h), 64657.30(c)(1), (2), and section 64654(b).

(b) For water systems that do not filter approved surface water, the supplier shall notify persons served by the system whenever:

(1) There is a failure to comply with sections 64652.5(b) through (k), sections 64652 and 64654(a), or section 64654(b);

(2) The turbidity level in a representative sample of the approved surface water immediately prior to the first or only point of disinfectant application exceeds 5 NTU; or

(3) The unfiltered approved surface water has been identified as a source of waterborne microbial disease outbreak.

(c) The notification required by either subsections (a) or (b) shall be given in accordance with section 64464.3(a)(2), and shall include the following mandatory language:

The State of California Department of Health Services (DHS) sets drinking water standards and has determined the presence of microbiological contaminants are a health concern at certain levels of exposure. If water is inadequately treated, microbiological contaminants in that water may cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and any associated headaches and fatigue. These symptoms, however are not just associated with disease-causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water. DHS has set enforceable requirements for treating drinking water to reduce the risk of these adverse health effects. Treatment such as filtering and disinfecting the water

removes or destroys microbiological contaminants. Drinking water which is treated to meet DHS requirements is associated with little to none of this risk and should be considered safe.

(d) For water systems that filter approved surface water, the supplier shall notify persons served by the system whenever there is a failure to comply with the monitoring requirements specified in sections 64655, 64657.40, or 64656. The notification shall be given in accordance with section 64464.6.

(e) For water systems that do not filter approved surface water, the supplier shall notify persons served by the system whenever there is a failure to comply with the monitoring requirements specified in sections 64652.5(b), (d), or (e), or 64656. The notification shall be given in accordance with section 64464.6.

(f) If a supplier is unable to remove a source from service pursuant to section 64652.5(l), the supplier shall notify the Department immediately, and notify persons served by the system pursuant to section 64465, using the language in subsection (c).

NOTE
Authority cited: Sections 100275, 116375 and 116450, Health and Safety Code.
Reference: Sections 116270, 116275, 116365, 116375, 116385, 116390, 116400, 116450, 116460, 116525, 116530, 116535, 116540, 116550, 116555, 116625 and 116735, Health and Safety Code.